Remarks/Arguments:

Claims 1, 7 and 13 have been amended. No new matter is introduced herein. Claims 1-13 are pending.

Claims 1, 7 and 13 have been amended to recite that at least one of the first, second and third light sources emits light with a different light intensity compared to the remaining light sources in the fourth light emission period. Basis for the amendment can be found, for example, at paragraphs [0066-0067]; and Figs. 2-6 of the original specification. No new matter is introduced herein.

The subject invention is drawn to a light emission method of a light source in a time division manner, a light emitting apparatus and a projection display apparatus. At least one of the first light source, the second light source and the third light source emits light with a different intensity compared to the remaining light sources in the fourth light emission period. According to the subject invention, the light source is capable of increasing an amount of light while maintaining a color's reproducibility, without producing a green color emphasis. The subject invention is able to maintain an equal light-amount ratio between a single-color light emission period and a light emission period in which all of the light sources emit light, such that the light amount is increased, while maintaining a color's reproducibility.

Claims 1-5, 7-11 and 13 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Takeda et al. (U.S. 2003/0218794) in view of Yoshinaga et al. (U.S. 6,961,038). It is respectfully submitted, however, that these claims are patentable over the cited art for the reasons set forth below.

Claim 1, as amended, includes features neither disclosed nor suggested by the cited art, namely:

> ... at least one of said first light source, said second light source and said third light source emits light with a different light intensity compared to the remaining light sources in said fourth light emission period. (Emphasis Added)

Claims 7 and 13 include similar recitations.

Takeda et al. concern an image display device which uses a solid light-emitting element and obtains white projected images as a whole by sequentially projecting R, G and B rays.

(Paragraphs [0002] and [0006]). In order to obtain a white image, the image is divided into three fields, and the luminous flux amount of the G-ray from a green color light source is emphasized compared to the R and B rays. (Paragraph [0006] and Paragraph [0086]). Takeda et al. disclose, in Fig. 5(a), turning-on periods and timings of respective green, red and blue light-emitting elements 11, 21, 22. The green, red and blue light-emitting elements are sequentially turned on in respective turning-on periods GT, RT and BT. (Paragraphs [0086-0087]). As shown in Fig. 5(a), the duration of turning-on periods GT, RT and BT are different from each other (Paragraphs [0087-0088]).

As acknowledged by the Examiner on page 3 of the Office Action, Takeda et al. do not teach a fourth light emitting step of making the first, second and third light sources emit light at a same time in a fourth light emission period, as required by claims 1, 7 and 13. Accordingly, Takeda et al. can not disclose or suggest that at least one of the first, second and third light sources emits light with a different light intensity compared to the remaining light sources in the fourth light emission period, as required by claims 1, 7 and 13. Thus, Takeda et al. do not include all of the features of claims 1, 7 and 13.

Yoshinaga et al. concern a liquid crystal display device for providing a three primary color display by time-sharing and providing full color display by mixing the three primary colors without using any color filter. (Col. 1, lines 10-13). An object of Yoshinaga et al. is to restrain a color sequential artifact and reduce a power consumption of light sources in the liquid crystal display device. (Col. 4, lines 52-56). Yoshinaga et al. disclose, in Fig. 3, a timing chart where: 1) R, G and B light sources are individually lit in R, G and B fields and 2) where the R, G and B light sources are lit at a same time in a fourth white (W) field. (Col. 9, lines 27-55). A brightness level for each of the R, G and B light sources in the W field (a fourth frame) is determined based on a detected brightness level of the image data. (Col. 8, line 25-Col. 9, line 5).

However, Yoshinaga et al. do not disclose or suggest that at least one of the first, second and third light sources emits light with a different light intensity compared to the remaining light sources in the fourth light emission period, as required by claims 1, 7 and 13. Instead, Yoshinaga et al. teach that the brightness level of each of the light sources is the same in the fourth frame. (Figs. 2, 3 and 5-8 of Yoshinaga et al.). Thus, Yoshinaga et al. do not include all of the features of claims 1, 7 and 13 and do not make up for the deficiencies of Takeda et al. Accordingly, allowance of claims 1, 7 and 13 is respectfully requested.

Claims 2-5 and 8-11 include all of the features of respective claims 1 and 7 from which they depend. Accordingly, these claims are also patentable over the cited art for at least the same reasons as respective claims 1 and 7.

Claims 6 and 12 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Takeda et al. in view of Yoshinaga et al. and further in view of Shigeta (U.S. 2002/0008712). These claims, however, include all of the features of respective claims 1 and 7 from which they depend. Accordingly, these claims are also patentable over Takeda et al. and Yoshinaga et al. for at least the same reasons as respective claims 1 and 7.

Shigeta does not makeup for the deficiencies of Takeda et al. and Yoshinaga et al. because it does not teach a fourth light emission period where light is emitted from each of first, second and third light sources at the same time. Instead, Shigeta discloses, in Fig. 12, a color filter having red, green and blue color areas separated by three white areas (W1, W2, W3). The white areas are used to perform a white luminescence emphasizing process. (Paragraphs [0100-0101]). Furthermore, both Takeda et al. (paragraphs [0004-0005]) and Yoshinaga et al. (Col. 1, lines 17-27) teach away from using a color filter. Thus, Shigeta would not be combined with Takeda et al. and Yoshinaga et al. Accordingly, the combination of Takeda et al., Yoshinaga et al. and Shigeta would not be made and, thus, the rejection of claims 6 and 12 is improper.

The subject invention includes advantages neither disclosed nor suggest by the cited art. Namely, a maximum brightness is provided which is capable of increasing the light amount while maintaining a color reproducibility without overemphasizing a green color (i.e. to prevent a lack of green uniformity). A duration of one image is divided into periods of single-light emission and a simultaneous light emission period. A brightness light intensity of R, G and B in each period is respectively decided to increase a light amount while maintaining a white-color reproducibility, without lacking a green uniformity. The present invention can substantially conform the ratio of the light amounts of respective single-color light emission periods to the light amount of a simultaneous emission period for the display of one image. Accordingly, this can increase the produced light amount while maintaining a color reproducibility, while preventing a lack of green uniformity.

According to the present invention, a light intensity of each light source is different for the single-color light emission periods and the simultaneous-color light emission period. In particular, during the simultaneous-light emission period, if a green color is lacking, the period of green light emission is prolonged, whereas the single light source emission periods for the remaining light sources are reduced and the light amount of remaining colors is, thus, reduced. Conversely, in a simultaneous-color emission period, a duration of all of the emitting periods (of R, G and B) is the same. To maintain the light amount ratio, the light intensity of the remaining colors is lowered, while maximizing intensity of the green color.

As described above, independent claims 1, 7 and 13 include a feature where at least one of the first, second and third light sources emits light with a different light intensity compared to the remaining light sources in the fourth (simultaneous-color) emission period. Accordingly, a ratio of the light amounts of the respective single-color light emission periods (i.e. the first-third light emission period) and the ratio of the light amounts of the respective light sources for the three colors within the fourth light emission period can be substantially the same.

In contrast, Takeda et al. do not disclose a simultaneous light emission period. Takeda et al. only disclose that to obtain white light, the luminous flux of the G-ray is increased so that the luminous flux amount of the G-ray necessary for obtaining white light can be obtained, (Paragraph [0088]). Therefore, Takeda et al. cannot disclose or suggest that at least one of first, second and third light sources emits light with a different light intensity compared to the remaining light sources in a fourth light emission period and, thus, Takeda et al. is not capable of increasing a light amount while maintaining a color reproducibility, without producing a lack of green uniformity.

Yoshinaga et al. disclose that a maximum value of the brightness level of a white signal for one frame is previously defined, to prevent a color artifact and reduce a power consumption of a display device. The emission intensity of each R, G and B is defined as a value multiplied by a proportion of the brightness level at the respective single-color emission periods, so that a distribution ratio of the emission intensity of R, G and B at a single light emission period and the ratio of the emission intensity of each color at a simultaneous emission period are the same. (Col. 12, lines 6-19). However, Yoshinaga et al. do not teach that at least one of the first, second and third light sources emits light with a different light intensity compared to the remaining light sources in a fourth light emission period, as required by claims 1, 7 and 13.

Accordingly, none of the cited art disclose or suggest all of the features and advantages of the subject invention, as recited by claims 1, 7 and 13.

In view of the foregoing amendments and remarks, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

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